

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)**

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2004/003873

International filing date (day/month/year)
25.11.2004

Priority date (day/month/year)
27.11.2003

International Patent Classification (IPC) or both national classification and IPC
C21C552, C21C556

Applicant
DANIELI & C. OFFICINE MECCANICHE SPA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Authorized Officer

Ceulemans, J

Telephone No. +31 70 340-3157



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

10/580550
1AP20 Rec'd PCT/PTO 26 MAY 2006
International application No.
PCT/IB2004/003873

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/B2004/003873

Box No. V Reasoned statement under Rule 43b/s.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-15
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/IB2004/003873

Re Item V.**Re Item V****Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1 Reference is made to the following document:

- D1 : PATENT ABSTRACTS OF JAPAN vol. 1996, no. 05, 31 May 1996 (1996-05-31)
& JP 08 005248 A (TOKYO ELECTRIC POWER CO INC:THE; others: 01), 12
January 1996 (1996-01-12)
- D2: DATABASE WPI Section Ch, Week 199805 Derwent Publications Ltd., London,
GB; Class M24, AN 1998-050598 XP002347548 -& RU 2 082 763 C1
(OSKOLSK ELECTROMETAL COMB) 27 June 1997 (1997-06-27)
- D3: US-A-6 004 504 (VALLOMY ET AL) 21 December 1999 (1999-12-21)
- D4: FR-A-2 838 508 (L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET
L'EXPLOITATION DES PROCE) 17 October 2003 (2003-10-17)
- D5: DATABASE WPI Section Ch, Week 200028 Derwent Publications Ltd., London,
GB; Class M24, AN 2000-326395 XP002347549 & RU 2 128 407 C1 (NOSTA
STOCK CO) 27 March 1999 (1999-03-27)
- D6: EP-A-0 592 723 (CONSTEEL S.A; TECHINT COMPAGNIA TECNICA
INTERNAZIONALE S.P.A) 20 April 1994 (1994-04-20)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the
subject-matter of claim 1 is not inventive in the sense of Article 33(3) PCT.

D3, which can be considered as representing the closest prior art, discloses a
method for the control of an electric arc furnace on the basis of the bath level and the
measurement of certain bath characteristics. The reason for controlling the bath level
is to be able to position the temperature sensor accurately and thereby obtaining
accurate, periodic and continuous measurement data of the melt temperature. By
controlling the temperature, optimum melting conditions as well as efficient energy

use can be maintained during the process (see column 1, lines 54-59).

In D3 the control of the melting process is accomplished by means of detecting the mass and velocity of the scrap charging, calculating the feed rate, measuring the bath level after tapping (heel) and measuring the steel bath temperature.

Hence, the subject-matter of claim 1 differs from D3, in that the feed rate is regulated and adjusted on the basis of the temperature data. In addition, the furnace weight is measured periodically, whereas in D3, the steel bath level is continuously predicted by means of computer computations on the basis of the measured data (see column 6, lines 55-61).

By adjusting and regulating the feed rate on the basis of the melt temperature, the energy consumption can be optimised and the wear and consumption of the electrodes and lining can be minimised.

This same solution for the same problem has been disclosed in D2. In D2 a method for controlling an electric melting furnace is described in which the temperature of the bath and the electrode power consumption are used to regulate the feed rate of the raw material. As a consequence an efficient melting and reduced consumption of the electrodes is attained.

With respect to the difference is determining the weight/content of the furnace, it would not require inventive skill to place weighing means onto the furnace bottom to obtain a weight indication in stead of a calculated value.

Hence, for a person skilled in the art, familiar with the teachings of D2 and D3, it would seem obvious to add the regulating means to the furnace of D3 for controlling the temperature and thereby arriving at a more efficient melting process, without the need for inventive skill.

3 INDEPENDENT CLAIM 9

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the

subject-matter of claim 9 is not inventive in the sense of Article 33(3) PCT.

Document D1 discloses an electric melting furnace to which scrap from a storage bunker is fed in a controlled way. The furnace contains means to measure the weight of the furnace constantly, means to regulate the feed rate of the scrap and means to measure the temperature of the melt.

The only technical feature which is lacking from D1 concerns the preheating of the scrap in a transport tunnel before being fed to the melting furnace. The preheating of the scrap improves the energy efficiency of the furnace. This effect as well as the solution are, however, well known in the art, see e.g. D3 and D6.

Hence, the subject-matter of claim 9 can not be considered to be inventive.

4 DEPENDENT CLAIMS 2-8, 10-15

Dependent claims 2-8, 10-15 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(2) and (3) PCT).

The subject-matter of claims 2-8 and 11-12 concerns process steps or related apparatus features which are considered obvious for the person skilled in the art who is familiar with operating a tiltable EAF in the most efficient (energy wise) way.

The subject-matter of claims 10 and 13-15 has been disclosed in D1 and therefore not inventive in combination with D3, for the same reasons as given above.

Re Item VIII.

Clarity (Art. 6PCT)

1 According to Article 6 PCT the claims have to be clear and concise. Claims 3, 5, 6, 11, 12 and 15 do not fulfil the requirements of Art.6 PCT for the following reasons :

1.1 The terms "about" and "around" used repeatedly in the claims 3, 5, 6, 12 and 15 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/IB2004/003873

- 1.2 Expressions like "for example" (claim 11) have no limiting effect on the scope of the claim; that is to say, the feature following any such expression is to be regarded as entirely optional (see also PCT Guidelines (ISPE/1, published 11/03/2004), Part II, Chapter 5, §5.40).